

What is claimed is:

1. A heat exchanger comprising

an enclosure having at least one input and at least one output for a first stream of fluid  
and at least one input and at least one output for a second stream of fluid,

at least three plates secured within said enclosure,

wherein said plates are adapted to prevent physical admixture of at least two streams  
of fluid,

and wherein said plates are adapted to transfer heat from at least one of said streams  
to at least one other of said streams.

2. The heat exchanger of claim 1, wherein said plates are arranged in a stack.

3. The heat exchanger of claim 2, wherein said stack comprises a plurality of approximately  
parallel plates.

4. The heat exchanger of claim 2, wherein said stack is adapted to permit flow of clean air  
within a first pair of plates, and combustion gas within a pair of plates that includes only one  
of said first pair of plates.

5. The heat exchanger of claim 2, wherein said stack is adapted to permit flow of clean air  
and combustion gas respectively within alternating pairs of said plates in said stack.

6. The heat exchanger of claim 1, wherein said plates are bent in a plurality of locations.

7. The heat exchanger of claim 6, wherein said plates are bent in a direction orthogonal to the  
flow of at least one of said two streams of fluid.

8. The heat exchanger of claim 1, wherein said plates are corrugated.

9. The heat exchanger of claim 1, wherein said plates comprise a material selected from a  
group consisting of stainless steel, aluminum, galvanized steel, mild steel, and aluminized  
steel.

10. The heat exchanger of claim 1, wherein said plates comprise a plate metal.

11. The heat exchanger of claim 1, wherein at least one of said streams comprises a stream of combustion gas.
12. The heat exchanger of claim 1, wherein at least one of said streams comprises a stream of clean air.
13. The heat exchanger of claim 1, wherein said fluid comprises a fluid selected from a group consisting of a gas, a plasma, or a liquid.
14. The heat exchanger of claim 1, wherein said streams of fluid are disposed orthogonally to one another.
15. An apparatus comprising
  - a fuel source,
  - an air source,
  - a combustion mechanism,
  - a combustion chamber adapted to receive fuel from said fuel source, air from said air source, and to contain an operative portion of said combustion mechanism, and having an output for combustion gas
  - a heat exchanger having an input connected to said output of said combustion chamber, wherein said heat exchanger comprises an enclosed stack of plates, said heat exchanger further having an input for clean air, an output for clean air and an output for combustion gas,
  - wherein said enclosed stack of plates comprises at least one first pair of plates that permits the flow of combustion gas between said first pair,
  - wherein said enclosed stack of plates comprises at least one second pair of plates that permits the flow of clean air between said second pair, and
  - wherein at least one of said first pair and said second pair jointly include a single plate.
16. The apparatus of claim 15, wherein said stack comprises a plurality of approximately parallel plates.
17. The apparatus of claim 15, wherein said plates are bent in a plurality of locations.

18. The apparatus of claim 17, wherein said plates are bent in a direction orthogonal to the flow of at least one of said combustion gas or said clean air.
19. The apparatus of claim 15, wherein said plates are corrugated.
20. The apparatus of claim 15, wherein said plates comprise a material selected from a group consisting of stainless steel, aluminum, galvanized steel, mild steel, and aluminized steel.
21. The apparatus of claim 15, wherein said plates comprise a plate metal.
22. The apparatus of claim 15, wherein said combustion gas and said clean air flow orthogonally to one another within said heat exchanger.
23. The apparatus of claim 15, further comprising an exhaust pipe connected to said combustion gas output of said heat exchanger.
24. A method comprising
- providing at least three plates,
  - disposing said plates to accommodate intra-plate flow of at least two streams of fluid,
  - adapting said plates to prevent physical admixture of at least two of said streams of fluid,
  - and adapting said plates to transfer heat from at least one of said streams to at least one other of said streams.
25. The method of claim 24, wherein said step of disposing comprises arranging said plates in a stack.
26. The method of claim 25, wherein said step of arranging comprises disposing said plates approximately parallel to one another.
27. The method of claim 25, further comprising said step of adapting said stack to permit flow of clean air within a first pair of plates, and combustion gas within a pair of plates that includes only one of said first pair of plates.

28. The method of claim 25, further comprising the step of adapting said stack to permit flow of clean air and combustion gas respectively within alternating pairs of said plates in said stack.
29. The method of claim 24, further comprising the step of bending said plates in a plurality of locations.
30. The method of claim 29, wherein said step of bending comprising bending said plates in a direction orthogonal to the flow of at least one of said two streams of fluid.
31. The method of claim 24, further comprising corrugating said plates.
32. The method of claim 24, wherein said plates comprise a material selected from a group consisting of stainless steel, aluminum, galvanized steel, mild steel, and aluminized steel.
33. The method of claim 24, wherein said plates comprise a plate metal.
34. The method of claim 24, wherein at least one of said streams comprises a stream of combustion gas.
35. The method of claim 24, wherein at least one of said streams comprises a stream of clean air.
36. The method of claim 24, wherein said fluid comprises a fluid selected from a group consisting of a gas, a plasma, or a liquid.
37. The method of claim 24, further comprising the step of disposing said streams of fluid orthogonally to one another.
38. The method of claim 24, wherein said plates are secured by welding.
39. A method comprising  
    providing a fuel source,  
    providing an air source,  
    providing a combustion mechanism,  
    disposing at least an operative portion of said combustion mechanism in a combustion chamber adapted to receive fuel from said fuel source, air from said air source, and having an

output for combustion gases

connecting a heat exchanger by an input to said output of said combustion chamber,  
wherein said heat exchanger comprises an enclosed stack of plates,

providing said heat exchanger with an input for clean air, an output for clean air and  
an output for combustion gases,

and adapting said enclosed stack of plates to permit the flow of combustion gas  
between alternating pairs, and clean air between the other pairs.

40. The method of claim 39, wherein said stack of enclosed plates comprises a stack of  
approximately parallel plates.

41. The method of claim 39, further comprising the step of bending said plates in a plurality  
of locations.

42. The method of claim 41, wherein said step of bending comprises bending said plates in a  
direction orthogonal to the flow of at least one of said two streams of fluid.

43. The method of claim 39, further comprising the step of corrugating said plates.

44. The method of claim 39, wherein said plates comprise a material selected from a group  
consisting of stainless steel, aluminum, galvanized steel, mild steel, and aluminized steel.

45. The method of claim 39, wherein said plates comprise a plate metal.

46. The method of claim 39, wherein at least one of said streams comprises a stream of  
combustion gas.

47. The method of claim 39, wherein said fluid comprises a fluid selected from a group  
consisting of a gas, a plasma, or a liquid.

48. The method of claim 39, further comprising the step of disposing said streams of fluid  
orthogonally to one another.

49. The method of claim 39, wherein said plates are secured by welding.

50. An apparatus comprising

a combustion chamber,

a source of electric power electrically connected to said combustion chamber,

a heater exchanger, connected to an output of said combustion chamber and

a secondary containment tub surrounding at least an area below said combustion chamber, said source of electric power, and said heat exchanger,

wherein said secondary containment tub is operative to prevent liquid leakage.

51. An apparatus for a fuel tank door comprising

a hinged panel disposed to be swung between a first position and a second position, said panel having at least a first side and second side,

wherein said first position is substantially vertical and said second position is more horizontal than said first position,

wherein said first side of said panel is provided with fuel absorbent pads, and

wherein said first side of said panel has an approximately pan shape.

52. An apparatus comprising

a heat exchanger for exchanging heat between combustion gasses and clean air,

a combustion source, connected to an input of said heat exchanger

a fuel tank, connected to an input of said combustion source

a generator electrically connected to said combustion source, and

an air cooling system for said fuel tank and generator, electrically connected to said generator,

wherein said cooling system uses air that is in a different stream from said clean air.

53. The heat exchanger of claim 1, wherein said heat exchanger is adapted to exchange heat in the range of about 20,000 BTU to about 10,000,000 BTU.

54. The apparatus of claim 15, wherein said apparatus is adapted to provide warmth in the range of about 20,000 BTU to about 10,000,000 BTU.

55. The method of claim of claim 24, further comprising adapting said plates to transfer heat in the range of about 20,000 BTU to about 10,000,000 BTU.

56. An apparatus comprising

at least three means for heat transfer,

at least two streams of fluid,

wherein said at least three means for heat transfer are also physical admixture prevention means for preventing admixture of at least two of said streams of fluid,

and wherein said means for heat transfer are adapted to transfer heat from at least one of said streams to at least one other of said streams.

57. The apparatus of claim 56, wherein said means for heat transfer are arranged in a stack.
58. The apparatus of claim 57, wherein said stack comprises a plurality of approximately parallel means for heat transfer.
59. The apparatus of claim 57, wherein said stack is adapted to permit flow of clean air within a first pair of means for heat transfer, and combustion gas within a pair of means for heat transfer that includes only one of said first pair of means for heat transfer.
60. The apparatus of claim 57, wherein said stack is adapted to permit flow of clean air and combustion gas respectively within alternating pairs of said means for heat transfer in said stack.
61. The apparatus of claim 56, wherein said means for heat transfer are corrugated.
62. The apparatus of claim 56, wherein said means for heat transfer are bent in a plurality of locations.
63. The apparatus of claim 62, wherein said means for heat transfer are bent in a direction orthogonal to the flow of at least one of said two streams of fluid.
64. The apparatus of claim 56, wherein said means for heat transfer comprise a material selected from a group consisting of stainless steel, aluminum, galvanized steel, mild steel, and aluminized steel.
65. The apparatus of claim 56, wherein said means for heat transfer comprise a plate metal.
66. The apparatus of claim 56, wherein at least one of said streams comprises a stream of combustion gas.
67. The apparatus of claim 56, wherein at least one of said streams comprises a stream of clean air.
68. The apparatus of claim 56, wherein said fluid comprises a fluid selected from a group consisting of a gas, a plasma, or a liquid.

69. The apparatus of claim 56, wherein said streams of fluid are disposed orthogonally to one another.